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Resources Evaluation Newsletter

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REN 4 September 1980

Technical Article 1.

AGGREGATING INVENTORIES

by
H. Gyde Lund and Hans T. Schreuder[1/]

ABSTRACT

Inventories are commonly combined to obtain a broader picture of the resource base. Unless the inventories were originally designed with aggregation in mind, however, combining may provide misleading and useless information. This paper provides a brief list of items to be considered when one is contemplating adding inventories, and shows how information from two or more surveys can be statistically combined.

INTRODUCTION

One of the charges to the Resources Evaluation Techniques Program is to work with cooperating federal agencies to insure that their resource inventories can be aggregated into appropriate data bases for national assessments. Lund (1979) outlines some methods and tools useful for the design phase of an inventory. This paper outlines some considerations to evaluate the combinability of existing inventories. The criteria for evaluating combinability at the national level can also be used at lower echelons.

Inventories are combined for a variety of reasons. A range manager may want to combine information from various locations to obtain an estimate of range condition for given vegetation type. A forester may want to combine data from various timber stands to obtain timber volume in a given ecosystem. A land administrator may require aggregation of inventories from each of his districts. Different land administrating agencies may be required to unite their inventories to create state, regional, or national assessments. Some agencies may conduct separate surveys of the same resource on the same piece of ground. Estimates from these surveys may need to be combined.

Statistics based on inappropriately combined sample data may be misleading, erroneous, or inconsistent. Making decisions based on combined data can be risky without knowing exactly what went into the data collection efforts. This paper discusses some items to be considered when deciding whether inventory data can be combined. It also shows two examples of how information can statistically be combined.

CONSIDERATIONS

The following are some criteria that can be used to evaluate the compatibility and combinability of inventory results.

A. Definitions.

1. Are the variables defined and used in the same way in each inventory? For example, is range condition defined, estimated, and used the same way in each region to arrive at a national estimate for the agency? Or if estimating the timber volume in an ecosystem, are the trees measured to the same diameter limits and are volumes computed using the same or compatible conversion processes? Is there consistency in units of measure and in standards of measurements?

2. Are the data or information to be combined collected within compatible time frames? Can data that are one year old be combined with some that are 20 years old as a single variable in reaching decisions or making interpretations?

   In both cases there is a serious question about the utility of the combined estimate when different variables are

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measured, or when the same variable is measured at widely different times.

B. Sampling Design.

1. Are the sample frames similarly defined and built in credible or objective ways?

2. Are the techniques for sample selection based upon statistically valid methods? If biased (unrepresentative) selection techniques are used, the validity of the data and estimates are often suspect.

3. Can estimates of sampling errors be calculated so you know "how good" the data you are combining is?

C. Control.

1. Are standards the same for each inventory? For example, do both districts map stands down to the same minimum acreage or does one use 5 acres and the other 40? If so, then the results may be misleading and erroneous if combined improperly.

2. Are area controls tied to a land and water common base such as that of the Bureau of Census and Bureau of Standards? Have the various agencies providing input into a county summary adjusted their acreages to the common base totals for that county? If not, then the total acreages may not agree with the base.

3. Are inventory areas mutually exclusive so that there is no partial overlap in the data collection (i.e., no two districts are inventorying part of the same piece of land)? If there is some overlap, part of the sample may carry excessive weight. If possible, this should be compensated for.

4. Has all the area been accounted for? Are there any areas not inventoried? If so, then the aggregated results should show this, and a statement may be needed about the possible effect of ignoring those areas.

5. Were adequate quality control checks applied in the data collection, compilation and summary processes?

The above questions need to be asked before the results of two or more inventories from the same year or from successive years can be combined. In some cases, the answers may indicate that combining information may be more misleading than helpful, and should not be done.

COMBINING ESTIMATES FROM SEVERAL SURVEYS

The following examples show how to combine two types of inventory data. The first example deals with the problem of two agencies conducting separate surveys on the same area for the same resource. This problem seems to have received little attention in the statistical literature. Murthy (1967; pp. 86-89) discusses a simple situation where simple random samples are combined. Wensel and John (1969) discuss a more complex specialized forestry situation combining variable-plot and fixed-plot information.

The second example shows how to combine two separate estimates on two different areas into one estimate for the same resource. This is, of course, stratified sampling, which is covered in most textbooks. Note, however, that our example does not specify sample selection within each stratum as long as it is done in a statistically valid manner.

Example 1: Two agencies conduct independent surveys to estimate the percent of unstable land in a given district. Both agencies use the same definition of unstable land, use valid but different sampling designs, use different sampling intensities, sample the same population with a compatible time span, and their sampling efforts yield independent estimates of the same quantity. Suppose the two estimates are respectively, 10% ($\bar{x}_1$) with a standard error of estimate of 2% (s_{e_1}), and 20% ($\bar{x}_2$) with a standard error of estimate of 5% (s_{e_2}). Then a reasonable combined estimate of unstable land in the district would be:

$$\bar{x} = w_1 \bar{x}_1 + w_2 \bar{x}_2, \text{ where } w_1 = \frac{1/s_{e_1}^2}{1/s_{e_1}^2 + 1/s_{e_2}^2} \text{ and}$$

$$w_2 = \frac{1/s_{e_2}^2}{1/s_{e_1}^2 + 1/s_{e_2}^2}$$

$$\text{or } \bar{x} = \frac{.25}{.29}(10) + \frac{.04}{.29}(20) = 11.4\%$$

This estimate is considerably closer to 10% then to 20% because the precision of the 10% estimate was considerably better than that of the 20% estimate.

An approximate standard error of estimate for the combined estimate is:

$$s_e = \sqrt{w_1^2 s_{e_1}^2 + w_2^2 s_{e_2}^2} = \sqrt{.74(4) + .02(25)} =$$

$$\sqrt{2.96 + .50} = 1.86\%$$

Example 2: A State Director wants to combine the estimates of total merchantable volume of pine sawtimber on two of his districts. Both districts used independent but statistically valid designs to obtain total merchantable volume to the same merchantability standards. In this case, two different populations are sampled. Assume the respective estimates for the two districts are $10 * 10^6 (\hat{x}_1)$ and $30 * 10^6 (\hat{x}_2)$ board feet of sawtimber with standard errors of errors of $1 * 10^6 (s_{e_1})$ and $2 * 10^6 (s_{e_2})$. Then a combined estimate of the total board foot volume on the two districts is: $\hat{x} = \hat{x}_1 + \hat{x}_2 = 10 * 10^6 + 30 * 10^6 = 40 * 10^6$ board feet with a standard error of

$$s_e = \sqrt{s_{e_1}^2 + s_{e_2}^2} = \sqrt{(1 * 10^6)^2 + (2 * 10^6)^2}$$

$= 2.24 * 10^6$ board feet.

CONCLUSION

This paper has discussed the criteria for evaluating combinability of inventory data from separate sources. In a nutshell, inventories may be combined if the same definitions (including terminology, standards and time frames) and statistically valid sampling techniques are used. If either of these two are lacking, the aggregated information should be questioned.

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Technical Article 2

MARKING PENS FOR AERIAL PHOTOGRAPHS AND TRANSPARENCY MATERIAL

by
Joseph J. Ulliman and Oliver J. Grah[1/]

INTRODUCTION

Marking pens are a necessity in aerial photo interpretation, delineation, and final mapping. Although there are many marking pens on the market, few are designed specifically for these needs. Technical hollow-tube drafting pens give excellent results on photographic surfaces and transparent overlays in the office. However, the utility of the technical pens for field use is questionable due to maintenance problems and relatively high cost. Technical pens cannot withstand abusive conditions, clog easily, and are not easy to refill under field conditions; the ink is not very durable, and degrades easily under conditions where there is higher potential for surface abrasion, bending of photos and moisture.

We have been asked many times in short-courses and through personal contacts which pen is best for the many photographic and transparent surfaces and conditions of use, especially in the field. Since we could not be explicit in our answer, we decided to conduct a very limited study using commonly available ink pens on different surfaces.

OBJECTIVES

Our objective was to compare a variety of plastic-tipped and synthetic fiber tipped ink pens with a technical hollow-tube pen, for the following features: (1) ink adherence on many surface types, (2) erasability, (3) pen tip size and type, (4) ink line width consistency, (5) durability of pen tip, (6) cost, (7) availability in many colors, (8) opaqueness of ink, (9) excessive water solubility, and (10) trouble free use.

PROCEDURES

Ten transparent overlay and photographic surfaces commonly used in aerial photo interpretation were used to compare the performance of 21 ink pens with a Faber-Castell[2/] technical pen using Pelikan ink. We made one assumption which

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1/ The authors are respectively Professor, Forest Resources and Graduate Assistant, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, Idaho 83843.

2/ Mention of trade names or products does not constitute an endorsement by the U. S. Department of Agriculture or Interior.

Table 1. Marking pen performance: ink characteristics by product surface, pen tip type, line widths when new and used, and pen cost. Table codes are shown in footnotes 2, 3, and 4.

	PRODUCT SURFACE									PEN CHARACTERISTICS			
	Glossy Print	Matte Print (luster)	Cibachrome	Emulsion Side, Transparency Film	Back Side, Transparency Film	Clear Acetate	Matte Acetate (frosted)	Clear Mylar and Laminate	Matte Mylar (frosted)	Pen Tip Type	Line Width New (mm)	Line Width Used (mm)	Cost ($)
OIL BASE INK PENS													
Micropoint Unimark 960[1]	5[2] ema[3]	5 r	5 ea	5 e	5 ea	5 ea	5 ea	5 e	1,3,4 n	LF[4]	.3	1.2	.79[5]
Pilot Ultra Fine Point Permanent SC-UF	5 ema	5 r	5 ea	5 e	5 ea	5 ea	5 ea	5 e	1,3,4 n	DF	.2	.4	.69
Sanford's Sharpie Extra Fine Point Marker 0.4 mm	5 ea	5 r	5 ea	5 e	5 ea	5 ea	5 ea	5 e	1,3,4 n	P	.4	.4	.79
Stylist Permanent (Niji)	5 r	5 r	5 ea	5 e	5 ea	5 ea	1,2,3 ea	5 e	1,3 n	DF	.4	.7	.69
SEMIPERMANENT WATER BASE INK PENS													
Faber-Castell	5 r	5 r	5 aw	1,3,4 n	5 maw	5 r	5 ew	5 4	5 m	T	.1 to 2.0	.1 to 2.0	5.50 to 11.00
Sanford's Vis a' Vis	1,2,4 maw	1,2,4 maw	1,2,4 a	1,3,4 n	1,2,4 maw	1,2,4 r	1,2,4 r	1,2,4 r	1,2,4 maw	LF	.5	1.0	.69
WATER BASE INK PENS													
Design (Art Pen)	0	1,3 n	1,3,4 n	1,4 n	0	0	1,4 r	0	1,2,4 maw	P	.2	.3	.79
Flair Hardhead	0	1,3 n	1,3,4 n	1,4 n	0	0	1,4 r	0	1,2,4 maw	P	.4	.4	.98
Flair regular	0	1,3 n	1,3,4 n	1,4 n	0	0	1,4 r	0	1,2,4 maw	DF	.5	.7	.69
Flair Ultra Fine	0	1,3 n	1,3,4 n	0	0	0	0	0	1,2 maw	DF	.3	.4	.79
Nikko Finepoint (99L & XL-2)	0	0	1,3,4 n	0	0	0	0	0	1,2 maw	DF	.2	.4	.69
Pentel Color Pen Fine Point No. 5630-114	0	0	1,3,4 n	1,4 n	1,2,4 maw	0	0	0	1,2 maw	LF	.3	.7	.39
Pilot Ball Liner	0	0	1,3,4 n	0	0	0	0	0	0	P	.3	.3	.98
Pilot Fine Liner	0	1,3 n	1,3,4 n	0	0	0	1,4 r	0	1,2,4 maw	DF	.2	.4	.69
Pilot Razor Point	0	1,3 n	1,3,4 n	0	0	0	1,4 r	0	1,2,4 maw	DF	.2	.4	.79
Sanford's Big Sig II	0	1,3 n	1,3,4 n	1,4 n	0	0	0	0	1,2 maw	P	.2	.3	.39
Sanford's Expresso Fine Point 0.3 mm	0	1,3 n	1,3,4 n	0	0	0	0	0	5 a	DF	.3	.5	.69
Sanford's Expresso Medium Point	0	1,3 n	1,3,4 n	0	0	0	0	0	5 a	P	.4	.5	.79
Stylist 0.2 mm (Niji)	0	1,3 n	1,3,4 n	0	0	0	0	0	5 a	DF	.2	.3	1.35
Stylist regular (Niji)	0	1,3 n	1,3,4 n	0	0	0	0	0	5 a	DF	.3	.4	.69
Wonderiter	0	1,3 n	1,3,4 n	0	0	0	1,4 r	0	1,2,4 maw	P	.3	.3	.49

[1] Brand names are listed for reference and do not, in the commercial sense, constitute endorsement by the authors or the University of Idaho.

[2] Ink characteristics are based on the following criteria: 0) ink meets none of the following criteria; includes pens whose ink does not adhere to surface; 1) ink adheres to surface; 2) ink is semipermanent and erasable by some means; 3) ink, when dry, is not excessively water soluble; 4) ink line has constant width and clean edges; 5) ink meets all criteria.

[3] Ink line erasable by following means: e - eraser; m - ammonia; a - alcohol; w - water; r - ink erasable by all these means; n - ink not erasable by these means. Ammonia damages the emulsion surface of Cibachrome. Water, ammonia, and alcohol damage the emulsion surface of transparency film.

[4] Pen tip type: LF - loosely packed fiber tip; DF - densely packed fiber tip; P - plastic tip; and T - technical hollow-tube tip.

[5] Determined at the University of Idaho Bookstore January, 1980.

may or may not be correct: all technical hollow-tube pens and their inks have very similar characteristics. The pens and surfaces are listed in Table 1.

The pens were used on each surface and checked for the following:

1. Adherence: ink either did or did not adhere to the surface; repelled ink was characertized by beading and streaking.

2. Erasability: after approximately one hour, ink that adhered to the surface was tested for removal by the following means: wiping with a cotton swab soaked with (a) water, (b) a weak ammonia solution, and (c) isopropyl alcohol; and, by (d) erasing with a soft drafting eraser.

3. Line width consistency and ink line edge character: these features were determined for newly purchased pens by making a line using light pressure and then measuring the line using a magnifying monocular comparator.

4. Pen tip durability: this characteristic was determined by applying normal application pressure on the pen tips for a longer length of time and then measuring the line width.

5. Excessive water solubility: this feature was subjectively determined after applying water and allowing the ink to dissolve without rubbing.

RESULTS AND DISCUSSION

Pen and ink character, ink line widths and erasability, and cost for ink pens are shown in Table 1. Generally, the water-base ink pens were not usable due to poor ink character, except for the few exceptions on matte mylar surfaces. On other surfaces where they did adhere, the ink was either excessively water-soluble or not erasable.

The semi-permanent water-base pens adhered to all surfaces and were erasable on all surfaces except the emulsion side of transparency film.

The oil-base ink pens generally adhered well, had consistent line widths, and the ink was erasable on all surfaces except the matte mylar. In general, where ink adhered, the longer the ink remained the more difficult it was to erase.

The non-technical ink pens were judged to be easily used in the field. None required special care or maintenance except for keeping the pen tip capped when not in use. By contrast, hollow-tube drafting pens become clogged easily and are troublesome to fill in the field. The oil-base ink pens are not excessively water soluble on a given surface and have durable ink which does not degrade under field conditions. Technical pen ink does not exhibit similar durable character, is easily cracked or scratched off, and is more susceptible to moisture in the field.

Pen tip durability and line width consistency were judged subjectively. Tip durability was dependent on pen tip type. Plastic tips were the most durable, with densely-packed fiber and loosely-packed fiber tips being progressively less durable. Line width consistency was dependent on pen tip durability. Technical pens were not tested for these characteristics, as these pens are designed for different methods of application which result in little or no pen tip wear or variation in line width.

All pens were available in the basic colors of black, red, green, and blue. Some pens were available in other colors as well. In all cases, ink translucence or opaqueness was related to ink color. Black was relatively opaque on all surfaces, whereas other colors showed varying degrees of translucence. Cost of most non-technical pens ranged from $.39 to $.98 in contrast to hollow-tube drafting pens which range from $5.50 to $11.00 (depending on make and tip size).

Many pens were desirable under certain conditions and, although they did not meet our criteria, would be ideal for special uses. Final decision as to which pen to use on a given surface depends on the desired ink character, line width, and pen tip durability aside from cost.[3/] Given this limited study and our desire for a pen other than the hollow-tube pens for use under field conditions, the Pilot Ultra Fine Point Permanent Pen was judged to provide the best performance. Our ranking of the overall usefulness in the field of the non-technical pens is: 1) Pilot Ultra Fine Point; 2) Sanford's Sharpie Extra Fine Point; 3) Stylist Permanent; 4) Sanford's Vis a, Vis; and, 5) Micropoint Unimark. All other pens are usable for special situations.

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STATE NATURAL HERITAGE PROGRAMS AND THE NATIONAL HERITAGE POLICY ACT

State natural heritage programs represent systematic and comprehensive approaches to the collection and utilization of information on the most representative, unique, or otherwise significant natural resources of a State. The State natural heritage program provides a single focal

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3/ More specific information is available on these pens if requested. We ask that other users send their comments, either on the pens tested here or other pens they may have used.

point within the State government for the collection, analysis, storage, retrieval, and distribution of natural resource information.

This information is collected by way of a comprehensive State-wide natural resource inventory which, in turn, is based upon a systematic classification of the State's natural resources. The collected information on the location and status of the State's most significant natural features, including rare or unique plant and animal species, representative plant community types, or unique geological formations, is then disseminated from the State natural heritage program for use by a wide variety of planners and decision-makers in both the public and private sectors. These users include state, county, and municipal government agencies; federal agencies such as the Forest Service, the Corps of Engineers, and the Fish and Wildlife Service; private planning and consulting firms; and private industry such as timber companies and mining and energy concerns.

A total of 27 States now have begun some type of State natural heritage program. Many of these programs are based on a standard approach developed by The Nature Conservancy, while other States have developed a more individualized approach. Some States have also chosen to integrate natural and cultural resource activities into a single, comprehensive State heritage program. States with ongoing natural heritage programs include: Arizona, Arkansas, California, Colorado, Georgia, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Texas, Washington, West Virginia, Wisconsin, and Wyoming.

In May of 1977, in his first Environmental Message, President Carter directed Secretary of the Interior Cecil Andrus to develop a proposal for a National Heritage Program which would strengthen and support existing State efforts toward natural and cultural heritage resource conservation, as well as encouraging States without a natural heritage program to voluntarily begin one. Secretary Andrus appointed a National Heritage Task Force, which included representatives of local, State and federal agencies, as well as concerned private sector groups, to develop the National Heritage Program proposal. The results of the Task Force report have since been molded by the Department of the Interior's Heritage Conservation and Recreation Service (HCRS) into the Administration's National Heritage Policy Act. This bill, which has now been introduced in both the Senate and the House, includes the following major provisions:

1. Creation of a National Register of Natural Areas which would parallel the existing National Register of Historic Places and would include natural areas nominated by State natural heritage programs and federal agencies because of their significance to the national, state, or local level.

2. Provision of technical and financial (through the Land and Water Conservation Fund) assistance to ongoing and anticipated State natural heritage programs in order to encourage the development of a nationwide network of State natural heritage programs which are comparable in format and between which natural resource information can be exchanged on a regular basis. Such a network would parallel the existing network of State historic preservation programs.

3. Requirements for federal agencies to cooperate with State natural and cultural heritage programs by providing States with information on resources located on federal lands, by incorporating State heritage resource data into ongoing federal planning and management procedures, and by taking steps to avoid negative impacts of federal and federally sponsored actions on properties listed on the National Register of Natural Areas and the National Register of Historic Places.

4. Creation of a Council on Heritage Conservation which would incorporate the existing Advisory Council on Historic Preservation and add to it new members and responsibilities for natural resources which would parallel those it presently holds for archeological and historic preservation.

The bill also includes several important provisions pertaining to the national historic preservation program, including the establishment for the first time by law of the position of the State Historic Preservation Officer, and the coification of the major features of Executive Order 11593 which apply to the responsibilities of the federal agencies with regard to cultural resource inventory and management.

The National Heritage Policy Act was introduced in the Senate as S. 1842 by Senator Henry Jackson in September 1979 and in the House as H. R. 6504 by Rep. Phillip Burton in February. Hearings on the bill were held March 17 and 18 before the House Subcommittee on National Parks and Insular Affairs and on April 17 before the Senate Subcommittee on Parks, Recreation and Renewable Resources. Further information on the Administration's Heritage proposal can be obtained from HCRS, 440 G St., N.W., Washington, D.C. 20243.

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RESOURCE EVALUATION TECHNIQUE'S INTERAGENCY WILDLIFE GROUP

A brief description of the RET Program, which included information on the development, organizational structure, scope, and goals of the Program, was presented in the first issue of the Resource Evaluation Newsletter (March 1980). Since that time, the interagency scope of the RET Program has been strengthened by the establishment of an Interagency Wildlife Group (IWG) at Fort Collins, in accordance with the Interagency Agreement for Classification and Inventories of Natural Resources signed in October 1978 by five Federal agencies (Forest Service, Bureau of Land Management, Soil Conservation Service, Fish and Wildlife Service, and the U.S. Geological Survey). Each of the five agencies, with the possible exception of the USGS, will be represented in the IWG. Congress, through various legislative acts (RPA/NFMA, FLPMA, RCA, Fish and Wildlife Act, and Organic Act) has directed the five Federal agencies to cooperate in the assessment of the Nation's natural resources by coordinating their activities involving the collection and analysis of natural resource information. The following mission statement of the IWG emphasizes the need for cooperation and coordination among those Federal agencies: "... to establish and promote a cooperative working relationship among its member agencies, and to provide guidance in the development classification, inventory, and analysis methodologies for national assessments of fish and wildlife resources. Thus, the IWG functions as a resource coordinating committee by providing technical assistance (guidance) to each of the four RET Research Work Units (National Analysis, National Classification, National Inventory, and Remote Sensing).

To insure that State fish and wildlife agencies are actively involved in national assessments, the Fish and Wildlife Service requested the assistance of the International Association of Fish and Wildlife Agencies in selecting a wildlife biologist and a fishery biologist from among the State fish and wildlife agencies for temporary assignment to the IWG under the Intergovernmental Personnel Act (IPA). Salaries, transportation expenses, and general supervision for these State members of the IWG are the responsibility of the Fish and Wildlife Service. Personnel of the IWG currently stationed at Fort Collins include Cliff Hawkes (FS), David Chalk (SCS), Jim Hagihara (BLM), Meredith Morris (FS), and Jim Whelan (FWS - Chairman). Henry Short (FWS) serves as Technical Advisor to the IWG and represents the Western Energy and Land Use Team. Stephen Miller, Chief of Wildlife Field Services for the Maryland Wildlife Administration, recently accepted the position as wildlife biologist under the State IPA agreement and will join the Group in September. The IPA fishery biologist will be selected soon.

Since mid-May, activities of the IWG have been directed primarily toward:

1. Reviewing the Information Needs Assessment, a recent product of the Analysis Project of the RET Program, to determine if the fish and wildlife resource information needs of cooperating agencies are being addressed adequately.

2. Assisting the RET Analysis and Inventory Projects in the preparation of problem analyses and study plans for assessment of fish and wildlife resources.

3. Reviewing the draft of the National Site (Land) Classification System status and plans report.

4. Completing a "charter" for the IWG which states the goal (mission), objectives, and functions of the IWG, based upon mutual agreement among the agency representatives and approval by the Interagency Policy Group.

5. Meeting with research and management personnel from parent and cooperating agencies to explain the role of the IWG in the RET Program.

6. Providing additional agency support for the Resource Evaluation Newsletter and assisting in the expansion of the newsletter mailing list.

An update of IWG activities will be included in each issue of the Newsletter.

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INTERNATIONAL GROUP ON HYDROLOGIC APPLICATIONS OF REMOTE SENSING AND DATA TRANSMISSION

The International Association of Hydrological Sciences (IAHS) is organizing a new international group to promote, communicate, and coordinate the applications of remote sensing and remote data transmission to hydrologic problems. At the XVII General Assembly of IAHS in Canberra, Australia, (December 1979), the IAHS Bureau approved organization of the International Committee on Remote Sensing and Data Transmission for Hydrology.

The first major activity planned by the Committee will be a one-week Workshop and Symposium on Hydrologic Applications of Remote Sensing and Remote Data Transmission, to be held in Exeter, England July 19-30, 1982. The meeting will be cosponsored by a number of other international organizations. The technical program will consist of invited and offered papers. Further details concerning the new International Committee or the planned workshop and symposium may be obtained by contacting A. Ivan Johnson, President, International Committee on Remote Sensing and Data Transmission for Hydrology, IAHS,

Woodward-Clyde Consultants, 2909 West 7th Avenue, Denver, Colorado 80204, U.S.A.

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EROS DATA CENTER TRAINING AIDS

Workshop exercises developed by EDC's Application Branch provide hands-on instruction in the application of remote sensing to natural resource inventory and management. Over 50 different exercises are available. Prices range from $30 and up, depending upon the number of accompanying photographs and overlays in the training package. A complete listing and more information on how to obtain these exercises are available from User Service, EROS Data Center, U. S. Geological Survey, Sioux Falls, SD 57198. Phone (605)594-6511, ext. 151.

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FORESTRY PROGRAMS FOR PROGRAMMABLE CALCULATORS

Colin Bagwell, 1601 Sun Valley Road, Huntsville, AL 35801, has compiled a listing of forestry programs suitable for programmable calculators. He is interested in adding to that listing and sharing his information on available new programs. His research has turned up information gaps in growth and yield data for hardwoods and projections of growth when intermediate stand conditions are known. If you know where these types of programs are available or if you want a copy of the listing Colin has compiled, please contact him directly.

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CURRENT LITERATURE

Please order directly from sources given ( ). In the case of journal articles, contact your local library for availability.

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MEETINGS, WORKSHOPS, AND SYMPOSIA

October 5-8, 1980. SAF National Convention. (Spokane Riverpark Center, Spokane, Washington). Theme: Land-Use Allocation: Processes, People, Politics, Professionals. Contact: Edward F. Robie, SAF, 5400 Grosvenor Lane, Washington, DC 20014. Phone: (202)897-8720.

October 6-10, 1980. Canadian Institute of Forestry Annual Meeting. (Chateau Laurier, Ottawa). Theme: Forestry in Canada - The Role of Governments. Contact: L. Carlson, Place Vincent Massey, 19th Floor, 351 Blvd., St. Joseph, Hull, Quebec K1A OE7 Canada.

October 6-11, 1980. Association of Interpretive Naturalists National Meeting (Cape Cod Sea Camps, MACS). Theme: Integrating Cultural and Natural Interpretation. Contact: Dr. Bill Randall, AIN, 15 State Street, Boston, MA 02109.)

October 26-27, 1980. Introduction to Agricultural Remote Sensing (Kansas City, Missouri). Contact: Branch of Applications, EROS Data Center, Sioux Falls, SD 57198, Phone: (605) 594-6511, ext. 114.

October 27-30, 1980. Estimating Populations of Terrestrial Birds. (Monterey, California). Contact: Dr. C. J. Ralph, Bird Census Symposium, P. O. Box 43, Hawaii Volcanoes Nat'l. Park, HI 96718.

October 28-30, 1980. National Conference on Remote Sensing for Resource Management. (Kansas City, MO). Contact: Soil Conservation Society of America, 7515 Ankeny Rd., Ankeny, IA 50021.

November 3-7, 1980. Water Resources Remote Sensing Workshop. Contact: Branch of Applications, EROS Data Center, Sioux Falls, SD 57198. Phone: (605)594-6511, ext. 114.

November 17-21, 1980. Remote Sensing and Geographic Information Systems in the Planning Environment. Contact: Remote Sensing, University of California Extension, 2223 Fulton St., Berkeley, CA 94720. Phone: (415) 642-1061.

November 17-21, 1980. Advance Course in Geological Remote Sensing Techniques. Contact: Branch of Applications, EROS Data Center, Sioux Falls, SD 57198. Phone: (605)594-6511, ext. 114.

November 25-26, 1980. Colloquium on the Application of Data from the Next Generation of Earth Resources Satellites (Montreal, Quebec). Contact: Mr. Keith P. B. Thomson, Canada Centre for Remote Sensing, 2464 Sheffield Road, Ottawa, Canada K1A OY7. Phone: (613)995-1210.

November 30-December 6, 1980. Arid Land Resource Inventories--Developing Cost Efficient Methods. (La Paz, Mexico). $20. An international workshop sponsored by IUFRO, SAF, Mexican Subsecretariat of Forestry and Wildlife, Mexican Assoc. of Professional Foresters, USDA Forest Service, and USDI Bureau of Land Management. Contact: H. Gyde Lund, USDA Forest Service, 240 W. Prospect St., Ft. Collins, CO 80526. Phone: (303)221-4390, ext. 202.

December 2-5, 1980. Seventy-first Western Forestry Conference. (Victoria, British Columbia). Contact: Western Forestry and Conservation Assn., American Bank Building, Portland, OR 97205.

December 8-11, 1980. National Conference on Renewable Energy Technologies. Contact: Donni S. Hopkins, Conference Coordinator, Hawaii Natural Energy Institute, Univ. of Hawaii at Manoa, 2540 Dole Street, Honolulu, HI 96822. Phone: (808)948-6379.

January 26-31, 1981. Growth and Yield Studies in Mixed, Indigenous Forests. (Los Banos, Philippines). Sponsored by IUFRO Subject Group S 4.01. Contact Prof. Joran Fries, Swedish Univ. of Agricultural Sciences, International Rural Development Center, S-750 07 UPPSALA, Sweden.

February 8-13, 1981. Society for Range Management Annual Meeting. (Tulsa, Oklahoma). Contact: Executive Secretary, SRM, 2760 W. 5th Ave., Denver, CO 80204.

April 6-11, 1981. Perspectives in Landscape Ecology: Contributions to Research, Planning and Management of Our Environment. (Eindhoven, The Netherlands). Contact: Ms. W. J. M. van Giersbergen, Congress Bureau of the Information Dept. TNO, 148, Juliana van Stolberglaan, 2595 CL The Hague - The Netherlands.

August 9-14, 1981. "INPLACE" Resource Inventories --A National Workshop. (Orono, Maine). Sponsored by Society of American Foresters, Society for Range Management, American Society of Photogrammetry, Wildlife Society and University of Maine. Contact: L. O. House, Great Northern Paper Co., Millinocket, ME 04462. Phone: (207)723-5131.

September 6-17, 1981. Seventeenth IUFRO World Congress. (Kyoto, Japan). Contact: Congress Secretariat, XVII IUFRO World Congress, P. O. Box 16, Tsukuba Norin, Kenkyu-danchi-Nai, Ibaraki, Japan 305.

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You have undoubtedly noticed that R.E.N. has three new sponsors. The USDA Soil Conservation Service, and the USDI Geological Survey and the Fish and Wildlife Service are joining the Forest Service and Bureau of Land Management in publishing this Newsletter. The mailing list is still maintained by the Division of Resource Inventory Systems USDI Bureau of Land Management (D-460) Building 50, Denver Federal Center, Denver, CO 80225. Those wishing to be added to the list should contact the Bureau directly. Any changes in mailing addresses or deletions should be accompanied with an old label.

Technical articles, news items, current literature and meeting announcements are sought for the Newsletter. All material received is to be grammatically and technically correct. Send your material to Resources Evaluation Newsletter, 240 West Prospect St., Fort Collins, CO 80526 or phone (303) 221-4390 ext. 202 or FTS 323-1202.

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Views expressed in this Newsletter may not necessarily reflect the position of some of the sponsoring agencies.

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